15 **Fowler MB**, Laser JA, Hopkins GL, *et al*. Assessment of the beta-adrenergic receptor pathway in the intact failing human heart: progressive receptor down-regulation and subsensitivity to agonist response. *Circulation* 1986;**74**:1290–302.
16 **Naqvi TZ**, Goel RK, Forrester JS, *et al*. Myocardial contractile reserve on dobutamine echocardiography predicts late spontaneous improvement in patients with recent onset idiopathic dilated cardiomyopathy. *J Am Coll Cardiol* 1999;**34**:1537–44.
17 **Pratali L**, Picano E, Otasevic P, *et al*. Prognostic significance of the dobutamine echocardiography test in idiopathic dilated cardiomyopathy. *Am J Cardiol* 2001;**88**:1374–8.
18 **Skalidis EI**, Parthenakis FI, Patrianakos AP, *et al*. Regional coronary flow and contractile reserve in patients with idiopathic dilated cardiomyopathy. *J Am Coll Cardiol* 2004;**44**:2027–32.
19 **Bach DS**, Beanlands RSB, Shwaiger M, *et al*. Heterogeneity of ventricular function and myocardial oxidative metabolism in nonischemic dilated cardiomyopathy. *J Am Coll Cardiol* 1995;**25**:1258–62.
20 **Grossman W**. Evaluation of systolic and diastolic function of the myocardium. In: Baim DS, Grossman W, eds. *Cardiac catheterization, angiography and intervention*. Baltimore: Williams and Wilkins, 1996:333–58.
21 **Viquerat CE**, Daly P, Swedberg K, *et al*. Endogenous catecholamine levels in chronic heart failure: relation to the severity of hemodynamic abnormalities. *Am J Med* 1985;**78**:455–60.
22 **Carrol JD**, Lang RM, Neumann A, *et al*. The differential effects of positive inotropic and vasodilator therapy in patients with congestive cardiomyopathy. *Circulation* 1986;**74**:815–22.
23 **Komeda M**, David TE, Rao V, *et al*. Late hemodynamic effects of the preserved papillary muscles during mitral valve replacement. *Circulation* 1994;**90**:190–4.
24 **Suga H**, Sagawa K, Shoukas AA. Load independence of the instantaneous pressure-volume ratio of the canine left ventricle and effects of epinephrine and heart rate on the ratio. *Circ Res* 1973;**32**:314–22.
25 **Starling MR**, Montgomery DG, Walsche RA. Load dependence of the single beat maximal pressure/volume ratios in humans. *J Am Coll Cardiol* 1989;**14**:345–53.
26 **Kass DA**, Beyar R. Evaluation of contractile state by maximal ventricular power divided by the square end-diastolic volume. *Circulation* 1991;**84**:1698–708.

IMAGES IN CARDIOLOGY

doi: 10.1136/hrt.2005.082685

A guide to difficult right ventricular pacemaker lead insertion

A 90-year-old woman was admitted for insertion of a replacement right ventricular pacemaker lead and VVIR generator after system failure caused by a lead fracture. After explantation of the generator, a 9 French sheath was introduced into the left subclavian vein by the Seldinger technique. A ventricular pacing lead was passed through the sheath, but the anatomy directed the lead around the lateral free wall of the right atrium and below the tricuspid valve (panel A). Lead manipulation with aggressively curved stylettes failed to direct it towards the tricuspid valve and the lead was too short to allow formation of a loop within the dilated right atrium in order to prolapse the lead into the right ventricle. This problem was solved by cutting the proximal third off an 8 French Judkins Right 4 angioplasty guide catheter before its passage down the venous sheath so that the distal end was in the right atrium. The lead was then passed through the guide catheter, the terminal angulation of which directed the lead superiorly, facilitating its passage across the tricuspid valve (panel B). The guide catheter was withdrawn by cutting it longitudinally and peeling the catheter away. The lead parameters at the end of the procedure were as follows: R wave 10 mV, threshold 0.4 V, impedance 673 Ω. This novel use of a guide catheter might prove useful to others in cases in which it is difficult to direct the ventricular lead towards the tricuspid valve.

R De Palma
R A Archbold
andrew.archbold@bartsandthelondon.nhs.uk